R10. Carrier, ITS/CVO Technology

UNDERSTANDING ITS/CVO TECHNOLOGY APPLICATIONS
Reference Manual

MODULE 10 -
CARRIER ITS TECHNOLOGY

US Dept of Transportation

Module 10 - Carrier ITS Technology

Title

Understanding ITS/CVO Technology Applications

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Reference Documents and Sites

1. "Intelligent Transportation Systems for Motor Carriers: Win, Place, and Show," published by Cambridge Systematics, Inc. for the ATA Foundation, 1996

2. "21st Century Trucking," published by the ATA Foundation, 1994

3. "21st Century Trucking, Volume II," published by the ATA Foundation

4. www.truckingtechnologymag.com

Large National Carrier

100+ power units, >1000 mile hauls

Functions and Examples of Technologies

Business Management

Accounting

Business software

Driver Settlement

Load Information/Matching

Electronic Data Interchange (EDI)

Credentials Management
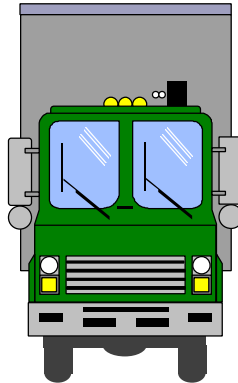
Operating Authority/Registration

Filing and receiving credentials

Fuel Tax

Computing and reporting (EDI)

Drivers' Log Auditing System

Hours-of-Service auditing/reporting

Information Management

Data Integration and Management Systems

Fleet Management

Routing and Dispatch/Mapping

Computer-Aided Systems

Mobile Communications

In-Vehicle Communication

Equipment and Load/ Tracking and Identification

Automatic Equipment Location

Data collection and Interchange

On Board/Handheld computers

Driver Management

Monitoring, training, credentials

Maintenance

Preventive maintenance tracking

Small Local Carrier

1-10 power units, <100 mile hauls
Functions and Examples of Technologies

Business Management

Accounting
Business software

Driver settlement

Load Information/Matching
Telephone/Fax

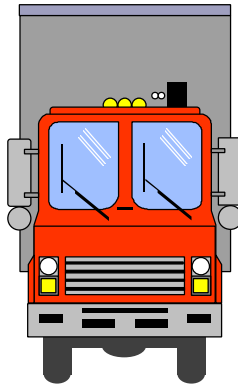## Credentials Management

Operating Authority/Registration
Filing and receiving credentials

Fuel Tax
Computing and reporting

Drivers' Log Auditing System
Hours-of-Service auditing/reporting

Information Management

Data Integration and Management Systems

Fleet Management

Routing and Dispatch/Mapping
Computer-Aided-Dispatch & Routing

Mobile Communications
In-Vehicle Communication
 Cellular phones, pagers, two-way radio

Equipment and Load/ Tracking and Identification
Driver reporting,
Engine Control Module monitoring,

On Board/Handheld computers

Driver Management
Monitoring, training, credentials

Maintenance
Preventive maintenance and tracking

Carrier ITS Technology Details

Function:

Automatic Vehicle Location (AVL) tracks vehicle location while on the road, and may use communications to relay this information back to a central site.

Technologies:

Global Positioning Satellite (GPS): A receiver located in the vehicle receives signals from special satellites to pinpoint the vehicle location.

Dead Reckoning: A magnetic compass is used in conjunction with the odometer to combine direction and distance to calculate the resulting position

Applications:

Fleet management applications include load planning and tracking to pinpoint delivery time and make efficient use of resources.

Carrier ITS Technology Details (cont.)

Function:

On-board data recording

Technologies:

On-Board Computer (OBC): An on-board computer may be connected to a variety of on-board sensors to record status, safety, and performance data, such as:

- Vehicle and engine speed
- Fuel consumption
- Braking patterns
- Refrigeration performance
- Driver log entries

Communication with carrier facility:

- Removable media
- Communication port
- Wireless communication

Applications:

Track and analyze fuel consumption and driving patterns to identify potential driving improvements

Track equipment use to drive maintenance schedules. May eventually support "smart maintenance system" software.

Track vehicle time and distance to support an electronic drivers log.

Carrier ITS Technology Details (cont.)

Technology:

Dedicated Short Range Communications (DSRC) Also called Automatic Vehicle Identification (AVI) or Vehicle to Roadside Communications (VRC)

Utilizes a transponder located in the cab of the vehicle to send identifying information to the roadside. The transponder may then receive driver signals (audible and visible), and/or data updates.

The roadside equipment consists of an antenna, mounted overhead or at the side of the road, and a reader. Transactions are controlled by a host computer.

Efforts are under way to establish standards for the physical and data link layers (ASTM E17.51), and for the message sets and protocols

(IEEE P1455). Standards could facilitate the use of common hardware and software for a variety of carrier applications.

Applications:

Electronic Toll & Traffic Management (ETTM) -- The transponder is used to identify electronic toll participants, so that they can be charged for the toll without stopping.

Electronic Screening -- Participating vehicles can be identified at or before weigh and inspection stations or Ports of Entry, and may be granted bypass based on known safety history and credentials.

Fleet Management functions -- Transponders can be used to identify vehicles entering or leaving the yard for tracking or security purposes. Functions may include gate control.

Carrier ITS Technology Details (cont.)

Technology:

Electronic Data Interchange (EDI)

Provides standards for message
content, packaging, and protocol
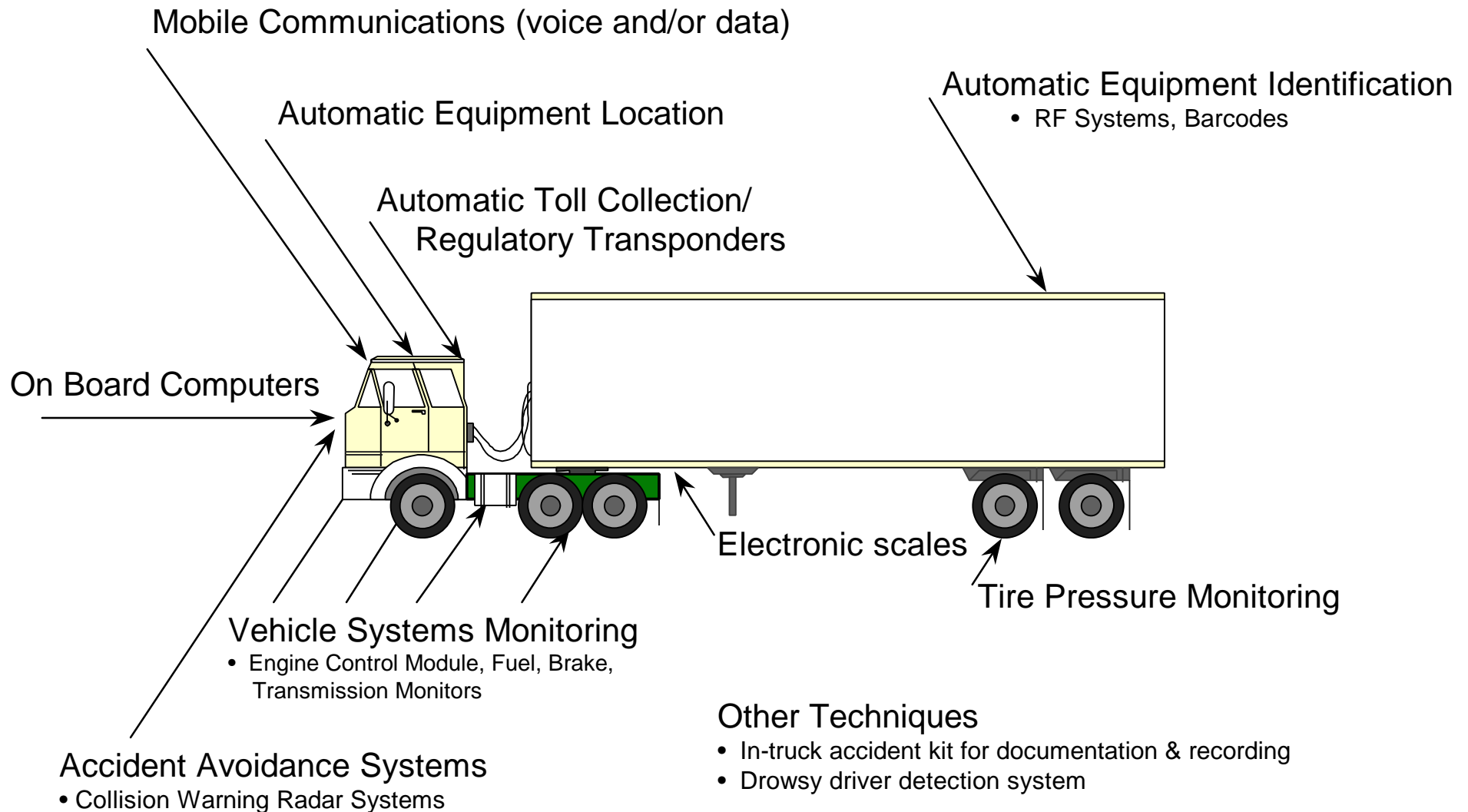so that transactions are
compatible at all interfaces.

Applications:

Electronic Invoices

Bills of lading

Electronic Credentials

Trucking Technologies -
In-Vehicle Devices

Mobile Communications (voice and/or data)

Automatic Equipment Location

Automatic Equipment Identification
- RF Systems, Barcodes

Automatic Toll Collection/
Regulatory Transponders

On Board Computers

Electronic scales

Tire Pressure Monitoring

Vehicle Systems Monitoring
- Engine Control Module, Fuel, Brake, Transmission Monitors

Other Techniques
- In-truck accident kit for documentation & recording
- Drowsy driver detection system

Accident Avoidance Systems
- Collision Warning Radar Systems

Trucking Technology Magazine Home Page
http://www.truckingtechnologymag.com/